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MODELING FAILURE USING THE CONVECTIVE PARTICLE DOMAIN INTERPOLATION METHOD IN A SHOCK PHYSICS HYDROCODE

Shane C. Schumacher[1]* and Kevin P. Ruggirello[2]

[1] Sandia National Laboratories[a]
PO Box 5800 MS-0836
Albuquerque, NM 87185-0836
scschum@sandia.gov

[2] Sandia National Laboratories[a]
PO Box 5800 MS-0836
Albuquerque, NM 87185-0836
kruggir@sandia.gov

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The modeling of failure in a finite volume shock physics computational code poses many challenges. We recently improved upon our recently implemented numerical technique the Material Point Method (MPM) [1] by adding the Convective Particle Domain Interpolation (CPDI) [2] to our finite volume shock physics computational code CTH. The CPDI technique improves accuracy and efficiency of the MPM for problems involving large tensile deformations and rotations. CPDI provides a method for the particles to remain in communication with each other by expanding the interpolation domain over that of the generalized MPM method. This will in turn prevent numerical fracture where fracture occurs when particles loose communication with one another while under going large tensile deformation. This work will focus on a comparison of the abilities of CPDI and generalized MPM in predicting the penetration of steel into aluminium [3]. Simulations of the experiments will be performed to quantify the two numerical techniques.

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